FACTORS AFFECTING NET INTEREST MARGIN OF ASEAN BANKS

Abstract

As one of the key financial intermediaries, banks play a significant role as providers of credits and liquidity to the Asean economies. Banks are able to execute this economic role efficiently provided they are profitable. The issue is: What affects banks' net interest margins in this region? This paper investigates six factors affecting net interest margin (NIM) of commercial banks in Malaysia, Thailand, Japan, Korea, Australia and New Zealand over 1998 to 2002. Although the banks are operating in different economies, the investigation reveals that loan to deposit ratio significantly affects the banks' NIM in all six Asean countries. Operating expenses to total assets and leverage emerge as the next significant factors affecting NIM of banks in most of the Asean countries. The findings also show that adjusted R-squared for Australian, Thailand and New Zealand banks falls within 38-42 percent range while R-squared for Malaysia, Korea and Japan falls within 15-17 percent range. The implications of the results are discussed in the paper.

Keywords: Banks, net interest margins, bank performance, profitability, leverage and ASEAN

1. INTRODUCTION

As one of the key financial intermediaries, banks play a significant role as providers of credits and liquidity to the Asean economies. Levene (1997) reports that the efficiency of financial intermediation effects economic growth. Banks are able to execute their intermediation function efficiently provided they are profitable. How does one measure a bank's profitability? Net interest margins (NIM) defined as the difference between the average rate earned on earning assets and the average rate paid on interest-bearing liabilities is a basic measure of a bank's profitability (Johnson, 2000). The issue is: What affects banks' net interest margins in this Asean region? Many studies have covered factors affecting NIM in Europe (Emmanuelle 2003), USA (Angbazo, 1997); New

Zealand (Tripe, 2002); Tunisia (Ben Naceur, 2003), Southeast Asia (Doliente, 2003); and OECD countries (Demerguc Kunt and Huizinga, 2003). However, a survey of existing literature reveals that there exists a gap in the studies of the factors effecting NIM in the Asean region. Hence, this paper attempts to identify the effects of several factors on NIM in Asean countries over 1998 to 2002 period, particularly in the light of substantial changes and restructuring that have taken place from the aftermath of the 1997 Asian Financial Crisis.

Past studies have showed that NIM varies across countries (Saunders and Schumacher, 2000). A study by Emmanuelle (2003) shows that the mean NIM for Denmark in the range of 4% to 5% is the highest mean NIM among the 12 European countries over 1988 to 1999 period.. On the other hand, Saunders and Schumacher (2000) find the mean NIM for Spain is the highest (5%) among Germany, France, Great Britain, Italy, United States and Switzerland over 1988 to 1995 period. Demirguc-Kunt and Huizinga (1999) show that NIM (by region among 80 OECD countries) is highest in transitional economies (6.4%) and also rather high in Latin America (6.2%). A study by Doliente (2003) on NIM in the Southeast Asia countries namely Malaysia, Indonesia, Thailand and Philippines reveals that the average NIM of banks in these countries is 3.07 %, which is ½ percentage point than Western Europe. The highest mean NIM is experienced by Philippines (4.21%) over 1994 to 1999 study period.

Despite being widely covered in past research, the analysis of net interest margins is important as it measures the cost of financial intermediation; that is the gross cost paid by a borrower to a bank and the net return received by a depositor (Brock and Suarez,

2000). More importantly, it provides an important link between bank performance, profitability and efficiency of the banking system. For instance, a large positive NIM may lead a bank to higher profit and it is also an indication of a greater efficiency (Demirguc-Kunt and Huizinga, 2003). Thus, identification of factors influencing net interest margins is an important contributor towards assuring banks' greater profitability and efficiency in executing their intermediation functions in the economy.

This paper is organised as follows. Section 2 presents a review of related literature on the determinants of bank interest margins. Section 3 discusses the methodology of the study followed by analysis of results in Section 4. Section 5 concludes the paper.

2. Review of Literature

2.1 Theoretical Model

Two modeling framework are commonly used in the study of NIM determinants. These are dealership approach and firm theoretic approach.

The dealership framework was developed by Ho and Saunders (1981). Their applied methodology is based on an adaptation of a model of bid-ask prices of security dealers (see, e.g. Ho and Stoll (1980) to the determination of bank interest margins. A bank is viewed as paying for funds (deposits) at one price (a 'bid' at one price) and lending funds at another (the 'ask' price) (Emmanuelle, 2003).

Under this model, bank is viewed as risk adverse dealers that act as a dealer in a market for immediate provision of deposits and loans. The bank receives deposits from customers at random intervals and subsequently utilize these funds to satisfy loan demands (Allen, 1989). Therefore in order to compensate for bank risk that arises from uncertainty associated with lending, bank would require the spread between loan and deposit rates.

This model has been extended and modified by a numbers of researchers such as Allen (1988) and Angbazo (1997). Allen used dealer model to consider heterogeneity in the loan portfolio and Angbazo used more extensive range of explanatory variables (including introducing default risk) to undertake an empirical exploration on net interest margins determinant.

The alternative model is the Firm theoretic approach developed by Klein and Monti (1972). Under this model, the bank is viewed as a firm in a static setting where demands and supplies of loans and deposits simultaneously clear both market. This model was explored by Zarruk (1989), Wong (1997) and Barajas, Steiner, and Salazar (1999).

2.2 Determinants of NIM

(i) Loan Quality

Using 1400 observations, Angbazo (1997) studies the determinants of bank net interest margins for a sample of US banks using annual data for 1989-1993 periods. The

result from the pooled data suggest that loan loss provisions to total assets, the opportunity cost of non bearing reserves, leverage and management efficiency are all positively related with bank interest spread.

Angbazo (1997) suggest that banks with more risky loans and higher interest rate risk exposure would select higher loan and deposit rates in order to achieve higher desired bank rate spread. One component of the spread is the premium from probability of loan default or credit risk (Ho and Saunder, 1981; Kramer, 2002).

Credit risk as a determinant of NIM has been empirically tested in several studies such as Abreu and Mendes (2003), Ben Naceur (2003) and Maudos and Guevara (2003). Abreu and Mendes (2002) study the bank interest margins and profitability for European bank using 477 observations. The finding shows that credit risk has a positive impact on net interest margins and profitability. The authors explain that during their study period, banks did watch carefully the lending process and did not grant credit at all costs (relaxing credit selection and monitoring), just for the sake of loan growth. This situation enables them to maintain low levels of non-performing loans, thereby increasing profits and net interest margins

Ben Naceur (2003) investigates the impact on bank's characteristics, financial structure and macroeconomic indicators on bank's net interest margins and profitability in the Tunisian banking industry. The study is for the 1980 to 2000 period using 210

Similarly, Emmenuelle (2003) studies European countries and find that default risk proxy is positive and significant for 8 of the twelve countries that is in Belgium, Denmark, France, Germany, Ireland, Netherlands and Portugal. Results for Spain and U.K shown positive coefficients but not significant. However, the coefficient is negative and significant in Greece and Luxembourg. The author suggests that a negative effect of credit risk on the bank interest margin is inconsistent with the theoretical model. This is because; asymmetric information is not explicitly taken into account here. The author explains that if riskier projects mean higher bank margins, then the probability of non-performing loans may increases. Therefore, banks may choose to increase their efforts in monitoring the loans rather than increasing their margins.

In contrast, Doliente (2003) found that the decline in loan quality for Indonesia and Thailand is significantly associated with lower net interest margins that replicate findings for Latin America. In Latin America case, Brock and Suarez (2002) cite two possible reasons to explain this anomalous reason. First, there could be inadequate provisioning for loan losses in Latin American banks, thereby lowering the calculated spread. Second, banks with a high proportion of bad loans may require lower spreads as a strategy to grow out of their troubles especially if regulatory authorities are irresolute in closing them.

From the observation, Doliente (2003) found that the anomalous Latin American was replicated in countries that were hardest hit by the Asian crisis, particularly, Indonesia and Thailand (Brimmer, 1998). The crisis inevitably gives an impact on bank

observations. The positive coefficients on bank loans notably reflect that bank loans are interest paying contrary to cash, thereby increasing net interest margins.

Guevara and Maudos (2003) analyses the interest margins in the principal European banking countries namely Germany, France, United Kingdom, Italy and Spain. The study covers 1993 to 2000 using a panel of 16,185 observations. In this study, credit risk is measured by loans to total assets. The finding shows that credit risk has a positive influence on the interest margins.

Claeys and Vennet (2003) analyze a sample of over 2000 banks from 36 Western and Eastern European countries over the years 1994-2001. Their studies included commercial banks, savings banks and cooperative banks because these types of banks are primarily engaged in financial intermediation. The authors used the proportion of total loans in total assets to predict the effects of default risk on net interest margins. They found that this ratio has a positive and significant effect on net interest margins, albeit more pronounced in the Southern EU and Eastern European bank markets. Since loans are most risky asset class, this findings supports the hypothesis that more lending results in wider margins, reflecting the bank's increased exposure to default risk. Claeys and Vennet also explain that the coefficient is much larger in absolute terms in Eastern European bank markets. This indicates that a substantial part of the interest margins in transition banking serves as a compensation for risk taking.

performance leading to most number of banks closed (Kane, 2000; Patten, Rosengard, and Johnston, 2001). Prior to the crisis the banking system of these two countries suffer the weaknesses in regulation, financial reporting, and extensive government guarantees, which explains the replication of the Latin American finding in Indonesia and Thailand (Doliente, 2003).

(ii) Liquidity

Traditionally, banks held liquid assets in order to guard against unexpected withdrawal by depositors or draw-downs by borrowers (Saidenberg and Strahan, 1999). Angbazo (1997) find that a bank with lower liquidity risk has lower liquidity risk premium in the net interest margins This result suggests that high liquidity fraction tends to buffer banks from the probability of liquidity crisis, lowers the cost of borrowed funds and hence increases their profitability and market value (Hughes et al. 1997).

This finding is supported by Doliente (2003) who finds that there is a negative relationship between liquid assets and net interest margins for Thailand and Malaysian banks. A possible explanation for this is that by holding liquid assets, banks may reduces the risk of having insufficient cash to meet deposit withdrawals or new loan demand which in turn forcing them to borrow at excessive costs. Thus, when bank liquid assets increases; bank exposure to liquidity risk decreases, leading to a lower liquidity premium component of the net interest margins (Angbazo, 1997; Drakos, 2003).

Demirguc-Kunt et al. (2003) analyse the impact of bank regulations, concentration and institutions on net interest margins of banks across 72 countries. They find that banks that hold high fractions of liquidity have lower interest margins. This is consistent with the notion that banks receive lower returns from holding cash or securities while facing a competitive market for deposits. In their study, Martinez, Peria and Mody (2004) find that banks in Latin America that hold a high proportion of liquid assets seem to charge higher spreads. In doing so, banks forego returns on such assets. This tends to motivate banks to transfer this opportunity cost to borrowers leading a rising of spread with liquidity ratios.

(iii) Capital ratio

In his study, Angbazo (1997) find evidence that capital base to total assets or leverage of banks in America is positively related to net interest margins. This is consistent with finance theory that substituting equity for debt reduces the risk of insolvency, and therefore lowers the cost of borrowed funds. However, since equity is a more expensive funding source, an increase in equity will increase the average cost of capital. Banks would therefore require higher net interest margins to absorb the increase in cost of capital..

Demirguc Kunt and Huizinga (1999) supported the findings of Angbazo (1997). They find that well capitalised banks in Europe have higher net interest margins and are more profitable. They rationalise that banks with higher capital ratio face lower costs of funding due to lower prospective of bankruptcy costs. Banks in New Zealand require

higher net interest margins since more of their operations are funded by equity (Tripe, 2002). Similarly, Emmanuelle (2003) found a significant positive effect of capital on NIMs in Denmark, Italy, Luxembourg, Portugal, Spain and U.K. which suggest that a higher capital ratio is compensated by higher net interest margins in these countries.

Doliente (2003) conducts a study in four East Asian countries; Malaysia, Philippine, Thailand and Indonesia. The result shows that there is a positive effect between bank capital and interest margins in Philippine, Indonesia and Malaysia but not Thailand.

In their study, Claeys and Vennet (2003) confirmed that capital serves as a signal of the banks' creditworthiness in both the Western and Eastern European bank markets. However, in Eastern European the capital ratio has a coefficient at least twice as large compared to that report for Western European banks. The most likely explanation for this sizeable effect can be found in the existence of a considerable degree of depositor discipline in transition banking, which may decrease the deposit cost of well capitalised banks, leading to higher interest margins. This finding also suggests that Eastern European banks may be able to use the excess capital to engage in more profitable lending activities, which also give an explanation increase interest margins.

On the other hand, Martinez Peria and Mody (2004) stressed that bank in Latin America that hold large equity ratios either on a voluntary basis or resulting from regulations can be costly for banks. This in turn supposed to motivate them to require higher net interest margins in order to recoup the cost incurred. However, the researchers

find that an equity ratio is not a significant determinant of net interest margins in Latin America.

(iv) Interest Rate

The duration gap between asset and liabilities measures respective changes in assets and liabilities due to an interest rate shock and is the key determinant of bank net interest margins (Mays, 1999). Angbazo (1997) has constructed interest rate exposure measurement to reflect a bank's re - pricing or maturity gap. Consistent with Flannery and James (1984), the measured exposure is the net position in short-term assets (assets with maturity period within one year). Angbazo's (1997) result shows that there is a negative correlation between short-term assets and interest rates. The result suggests that the increase in short-term assets indicates a lower interest rate risk exposure. Therefore, bank would require smaller interest rate risk premium.

Conversely, Wong (1997) performed a firm-theoretical model of bank behaviour to study the determinants of optimal bank interest margins. He found that the optimal bank interest margins react positively to an increase in market power, an increase in operating expenses, an increase in interest rate risk and an increase in credit risk. Brock and Franken (2003) used interest rate volatility as a proxy for liquidity (interest rate) risk. Their results strongly confirmed the predictions of the dealership model that a higher NIM is required to commensuarate for the increase in

Using the end of quarter market risk number* to reflects interest rate risk, Tripe (2002) finds that the positive coefficient for interest rate risk is consistent with risk return trade off, where the more interest rate risk a bank takes, the higher its interest margin should be. Meanwhile, Emmanuelle (2003) used the ratio of loans to bank's customer and short term funding as a proxy for the transformation interest rate risk. The result shows that the higher the level of loans, the greater is the net interest margins required. The significant impact of transformation risk on bank net interest margins is prevalent in 10 European countries except for Greece and Netherlands.

Maudos and Guevara (2003) employ the annual standard deviation of daily interest rates of three alternative types to approximate the average period of maturity of the assets and liabilities in the banks' balance sheets in European Union. Those are interbank market interest rates, medium term public debt and long-term public debt. They find that interest rate risk coefficient indicates a positive sign. This suggests that firms that assume greater market interest rate risk work with higher interest margins.

(v) Management Efficiency

In his study, Angbazo (1997) proves that there is a positive interaction between net interest margins and management efficiency. This is because management decisions affect the composition of assets that are earning high interest (or, conversely, liabilities which are low cost sources), thus, increases in earning assets would be reflected in higher net interest margins.

* This is measured according to a standard methodology. See Harrison (1996).

Tripe (2002) reported that the positive coefficient for management efficiency in New Zealand bank means that a greater proportion of interest earning assets will be reflected in higher interest margins. However, a different measure of management efficiency used by Brock and Franken (2003) reveals different result. The researchers measure management efficiency of Chile banks using a ratio of loans to number of employees. They find a negative and statistically significant relationship between management efficiency and net interest margins.

In their study, Maudos and Guevara (2003) suggest that high quality management translates into a profitable composition of assets and a low cost composition of liabilities. The researchers measure the quality or management efficiency by cost to income ratio, which is defined as the operating cost necessary to generate one unit of gross income. Maudos and Guevara (2003) revealed there is a negative correlation between management efficiency and interest margins in European Union. This indicates that any increasing in this ratio will decrease the quality of bank management, which will translate into a lower interest margins.

3. Methodology

3.1 Data

This study uses income statement and balance sheet data from the Malaysian commercial bank annual reports. The sample consists of 50 observations on 10-anchor

banks including Maybank Berhad, BCB Bank Berhad, Public Bank Berhad, Southern Bank Berhad, EON Bank Berhad, Affin Bank Berhad, Arab Malaysian Bank Berhad, RHB Bank Berhad, Hong Leong Bank Berhad, and Multi Purpose Bank Berhad. The relevant financial ratios of banks from other Asean countries are extracted from the Bankscope Database, Monash University, Melbourne, Australia. The number of observations is 172 for banks in Australia, 311 in Japan, 239 in Korea, 70 in Malaysia, 76 in New Zealand and 159 in Thailand. The study period is five years from 1998 to 2002.

3. 2 Theoretical Model

The dealership framework, which was developed by Ho and Saunders (1981) has been chosen in this study to model net interest margins. This model has been extended and modified by a numbers of researchers such as Allen (1988) and Angbazo (1997). Allen used dealer model to consider heterogeneity in the loan portfolio and Angbazo used more extensive range of explanatory variables (including introducing default risk) to undertake an empirical exploration on net interest margins determinant.

As mentioned in Section 2.2, under this model, bank is viewed as risk adverse dealer that act as a dealer in a market, that is, the bank receives deposits from customers at random intervals and subsequently utilize these funds to satisfy loan demands (Allen, 1989). Interest margin thus represents the spread between loan and deposit rates to compensate for the potential risks associated with lending business.

Following the methodologies adopted by Ho and Saunders (1981), Mcshane and Sharpe (1985) and Angbazo (1997), net interest margins (NIM) is assumed to be a function of the desired (or pure) spread and bank specific factors:

NIMit = F(S*it(.), Xit,Uit)

Where:

NIM = the published net interest margins of bank i at year t,

F(S*it(.) is the desired interest rate spread or the pure spread between loan and deposit rates. It represents the compensation bank charge on customers due to uncertainty about loan and deposit transactions, X_{it} is a vector of criterion variables and in this study they are; asset quality, liquidity, management quality, capital , operating expenses and leverage that influence bank NIMs for each bank *i* at year *t*, and U_{it}, is the residual and used to reflect all other market imperfections and regulatory restrictions affecting NIM.

Accordingly, the model is mathematically expressed as:

$$NIMit = \beta_0 + \beta_1*MGT + \beta_2*LLP + \beta_3*LIQ + \beta_4*CAP + \beta_5*LEV + \beta_6*OPEXP + E_{it} \ldots\ldots(1)$$

Where.

NIMit = net interest margin of bank j in time t

β_0 = constant

β_1 = parameter for management quality (MGT)

β_2 = parameter for asset quality (LLP)

β_3 = parameter for liquidity (LIQ)

β_4 = parameter for capital (CAP)

β_5 = parameter for loan to deposit ratio (LEV)

β_6 = parameter for operating expenses (OPEXP)

E_{it} = error term for bank *i* at year *t*

3.3 Dependant Variable

This study uses net interest margins as dependant variable. There are a number of indicators used to measure banks' net interest margins. Those normally used are the ratio of net interest income to average earning assets (Ho and Saunders, 1981), the ratio of net interest income to average total assets (Angbazo, 1997), and spread (average interest rate on interest bearing assets less the average interest rate on interest bearing liabilities). In fact, these measures are generally quite closely related to each other. However, the differences only arise from amount of non-interest bearing assets and non-interest bearing liabilities (plus capital) (Tripe, 2002).

In this study, we follow Abreu and Mendes (2002), Emmanuelle (2003) and Ben Naceur (2003) to gauge NIM as the spread between interest revenues and interest expenses (before loan loss provision) divided by total assets. The equation can be formally stated as:

$$NIMt = NIIt/\ TAt$$

$$= \frac{\sum_{k=1}^{m} [YkTAk - rkLk]_t}{TA_t}$$

Where,

NII is net interest income (interest income less interest expenses) in t,

TAt is a total asset in t,

Yk is the interest rate on assets in k,

TA_k is the amount of earning assets in k,

r_k is the interest rate on liabilities in k, and

L_k is the amount of liabilities in k

3.4 Independents Variables

Independent variables consists of six variables namely, management efficiency (MGT), loan quality (LLP), liquidity (LIQUID), Capital (Cap) and Leverage (LD) and operating expenses (OPEX)

Loan quality is measured by the bank's ratio of loan loss provisions to total loans. This is consistent with Angbazo (1997), Emmanuelle (2003), and Doliente (2003). Santomero (1983) stated that loan losses associated with the portfolio represent an amount a bank charges and sets aside that equals to the amount that will be uncollectible in the future.

The decline of loan quality is associated with increase operating expenses because it incurs during loan monitoring process. It is the additional expenses for working out or selling these loans (Doliente, 2003). Beside that, the impact wills obliges bank to charge additional risk premiums to recoup the financial cost that they might face (Barajas, Steiner, and Salazar, 1999). Thus, operating expenses in this study is the total interest expenses and non-interest expenses (including overheads) to Total assets.

Interest rate is the main factor in determining bank performance. The profits that bank earn from lending to borrowers are risky owing in part to changes in interest rate risk in financial markets. Due to that bank are in interest rate risk when changes in market interest rates cause bank profits to fluctuate (Hubbard 2002). The effect of interest rate risk on bank NIM is expected to be negative related. This is because the higher the level of short-term assets, the lower exposure bank to interest rate changes. The reason is, when bank hold a large fraction of long-term assets the probability to interest rate risk exposure also high due to future uncertainty due to fluctuation in interest rate, which are influenced by changes in market condition (Rose and Kolari, 1995).

Liquid assets as defined by Uyemura and Van Deventer (1993) refer to liquid assets less volatile liabilities. The impact of liquid assets on bank spread is examined by using a ratio of liquid assets to total liabilities. This ratio was applied by Angbazo (1997). This ratio represents bank liquidity risk and expected to negatively related with bank net interest margins. This is because when bank increase high fractions of liquid assets its exposure to liquidity risk is low. This, leads to a lower liquidity premium component of the net interest margins.

Core capital (leverage) is used as a proxy for the risk of insolvency. This is measured by core capital divided by total assets (core capital = shareholders fund + minority interest – goodwill). There are several existing empirical studies that used this ratio to predict NIM. Those are Angbazo (1997), Brock and Suarez (2000), Saunders and Schumacher (2000), Tripe (2002), Doliente (2003), Claeys and Vennet (2003). The

capital base represents the owners' investment in the business and the higher banks capital implying the lower banks solvency risk. Since equity is more expensive funding source than debt, an increase in equity capital may increase the average cost of capital. Thus, banks are expected to recover these costs by imposing an extra spread premium.

However, we test a new measurement of leverage for banks. Following the study by Thilainathan (1997) and Obiyathullah (1998), leverage for Malaysian banks is explained by the proportion of their loans to the size of deposits.

The ratio of earning assets (Earning assets = Total assets – non earning assets) to total assets is used to estimate the components of the interest margins that are attributable to management quality. This is suggesting by Angbazo (1997), and Tripe (2002). The result is expected to be positive correlation between management efficiency and margins, that when management efficiency increases bank revenues also increased.

4.6 Statistical Techniques

Multivariate regression analysis is used to determine the factors affecting NIM using E-view statistical package. The econometric problems relating to multicolinearity and heteroskedasticity are addressed. Multicolinearity is assessed statistically using correlation analysis and collinearity diagnistic (indicated by tolerance value and Variance Inflation Factor). In order to ensure the residual are not heteroskedastic, the variables are

corrected for heteroskedasticity using White (1978) procedure. In our study we have state a parameter at 5% significant level.

5.0 Analysis of Results

Table 1 shows the results on the mean statistics of the NIM determinants for the six Asean countries. The mean NIM for Malaysian banks is 2.5 percent, which is almost at par with the mean NIM 2.4 percent of New Zealand banks. The mean NIM for all 1052 sample banks over the 1998 to 2002 period is approximately 2 percent. The statistics indicate that the Malaysian commercial banks obtained the highest NIM among the Asean countries over the study period. This result is supported by the fact that the Malaysian banks has the highest proportion of earning assets to total assets (89.8%) as compared to Australian, Japan, Korea , New Zealand and Thailand banks, which have 65% of their total assets in the form of earning or interest-based assets.

While mean capital ratio is highest for Malaysian banks (8.6%), the mean leverage measured by loans to deposit ratio is found highest in Australian banks. The mean ratio of 1.64 time suggests that Australian banks is comparatively highly geared where the size of their loans is more than the size of their deposits. This finding is in contrast to the notional understanding in banking literature that loan should be adequately covered by deposits. However, there exists a large standard deviation among banks in Australia in terms of loan-deposit ratio. Except for this ratio, Table II shows

that the standard deviation of the criterion variables is very small, which indicate that there is a small difference in the six independent variables of among the Asean banks.

The correlation analysis carried out for each country reveals that there are no serious multicollinearity problems among the variables. Table III shows the tolerance value and VIF statistics are within acceptable levels (Hair et al, 1998). Hence, we proceeded with the test of determinants of NIM and the regression result is summarized in Table IV.

The six independent variables: MGT, LLP, LIQ, CAP, LEV and OPEX collectively explain the variation in NIM better for Australian, Thailand and New Zealand compared to the other 3 Asean countries. The adjusted R-squared is 0.42, 0.33 and 0.39 for Australian, Thailand and New Zealand banks respectively. On the other hand, the adjusted R-squared is 0.14 for Japan, 0.19 for Korea and 0.18 for Malaysia.

Except for Malaysian and New Zealand banks, MGT is positively related to NIM of Australian, Japan, Korea and Thailand banks. This shows that the higher the management efficiency in managing their earning assets, the better is their NIM. This positive effect is significant in Australia, Japan and Thailand and the finding is consistent with Angbazo (1997; Tripe, 2002. However, MGT is not significant for Malaysia and New Zealand during the study period.

LLP as a measure of loan quality has mixed effects on NIM. For instance, LLP is significant and positively related to NIM for banks in Australia and Malaysia. The positive coefficient for LLP indicates that the precautionary step adopted by banks to make adequate provisions for eventual loan loss is effective since the provision will not affect the cash flows in the event of loan defaults, thus increases NIM. Conversely, LLP is not significant and is negatively related to NIM for Japan, Korea, Thailand and New Zealand.

Liquidity (LIQ) affects NIM significantly for banks in Japan and New Zealand. For Japan, the coefficient estimate of LIQ is -2.475, which suggest that a higher liquid ratio reduces NIM. This is consistent with banking theory as a higher proportion of assets in loans and interest-bearing assets generally yield higher interest income for banks. In contrast, the coefficient estimate of LIQ for New Zealand is +5.354 suggesting that higher liquid ratio increases NIM of New Zealand banks. The possible reason could be due to lower interest rate prevailing in this country during the 1998 to 2002 study period.

The results also show that capital base ratio (CAP) affects NIM significantly for banks in Australia, Japan, New Zealand, Korea. The coefficient estimate of CAP is +3.288 and 2.952 for Australia and Korea respectively. This finding is consistent with Angbazo (1997), Demirguc-Kunt and Huizinga (1999), Tripe and Neceur (2003) and Claeys and Vennet (2003). The negative relationship between CAP and NIM for Japanese banks is probably unique to time-specific factors during this study period.

Leverage (LEV) newly defined as loan to deposit ratio is positive and significant for banks in all the six Asean countries (with New Zealand at 10% significant level). This finding is consistent with banking theory as the higher the ratio, the higher is the NIM arising from a bigger loan portfolio. This suggests leverage has a significant and positive impact on NIM as in Demirguc Kunt and Huizinga (1999), Ben Naceur (2003) Claeys and Vennet (2003). However, these studies use loan to total assets.

Operating expenses (OPEX) comprising of total interest expense and non-interest expense to total assets is found to significantly affect NIM of Japenese, Korea, Thailand and Malaysian banks. The coefficient estimate of OPEX is +2.432 (Japan), +4.632 (Korea), -3.173 (Thailand) and +2.122 (Malaysia). The positive signs indicate that banks have efficiently and effectively managed their high operating expenses (arising from maintaining larger assets portfolio) to obtain higher NIM. This positive and significant relationship between operating expenses and NIM supports Doliente (2003). The negative sign suggests that higher operating expenses have not been effectively managed, thus reduces NIM. OPEX significant and negative effect on NIM of Thailand banks over 1998 to 2002 study period remains the same and is consistent with Doliente (2003) which covers 1994 to 2001 study period.

6. CONCLUSION

This study attempts to find out factors affecting NIM of banks in 6 Asean countries namely Australia, Japan, Korea, Thailand, Malaysia and New Zealand, which

has not been tested before. The study also covers a new time frame-1998 to 2004, which is after the 1997 Asian Financial Crisis and a period where banking sector experienced several changes in its financial landscape. These results can serve as a basis for framing appropriate policies by each country's regulatory authorities in optimizing net interest margins to their efficient levels.

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Table I: Mean value

	AUS	JAPAN	KOREA	M'SIA	N.Z	THAI
NIM	0.0208	0.0197	0.0228	0.0250	0.0244	0.0171
MGT	0.6534	0.6609	0.6326	0.8986	0.6582	0.6483
LLP	-0.0017	0.0086	0.0233	0.0190	0.0010	0.0211
LIQ	0.0519	0.1257	0.1228	0.0140	0.0629	0.1281
CAP	0.0594	0.0404	0.0453	0.0869	0.0378	0.0539
LEV	1.6436	0.6790	0.8128	0.7833	0.0658	0.5985
OPEX	0.0594	0.0191	0.1204	0.0515	0.1199	0.0686
N	172	311	239	70	76	159

Table II: Standard Deviation

	AUS	JAPAN	KOREA	M'SIA	N.Z	THAI
NIM	0.0117	0.0041	0.0088	0.0059	0.0062	0.01756
MGT	0.0323	0.0666	0.0220	0.0455	0.0175	0.02499
LLP	0.0270	0.0059	0.0299	0.0158	0.0023	0.11791
LIQ	0.0277	0.0425	0.0445	0.0065	0.0360	0.09122
LEV	0.0354	0.0122	0.0210	0.0262	0.0188	0.03031
LD	1.7351	0.2074	0.4509	0.1301	0.0363	0.2166
OPEX	0.0199	0.0193	0.2742	0.0156	0.1682	0.03131
N	172	311	239	70	76	159

Table III: Colinearity Diagnostic

	AUS		JAPAN		KOREA		M'SIA		N.Z		THAI	
	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF	Tolerance	V
MGT	0.873	1.146	0.988	1.012	0.910	1.099	0.954	1.049	0.744	1.343	0.913	
LLP	0.909	1.100	0.905	1.105	0.900	1.111	0.954	1.049	0.420	2.383	0.902	
LIQ	0.774	1.293	0.872	1.146	0.871	1.148	0.776	1.288	0.164	6.080	0.706	
LEV	0.854	1.170	0.862	1.161	0.900	1.111	0.976	1.024	0.656	1.524	0.894	
LD	0.821	1.218	0.808	1.238	0.884	1.132	0.965	1.037	0.176	5.677	0.692	
OPEX	0.962	1.040	0.918	1.089	0.977	1.024	0.782	1.279	0.786	1.272	0.806	

Table IV: Summary Regression

LN	AUSTRALIA	JAPAN	KOREA	THAILAND	MALAYSIA	N.Z
MGT	0.0726 (3.1668)***	0.0728 (2.2069)**	-0.0043 (-0.1198)	0.202 (3.1295)***	-0.0091 (-0.5284)	-0.0346 (-0.8258)
LLP	0.1201 (3.7035)***	-0.0057 (-0.1210)	-0.0127 (-0.4825)	-0.0122 (-0.8659)	-0.1504 (4.0354)***	-0.4651 (-1.5578)
LIQ	0.0103 (0.2279)	-0.0141 (-2.4754)**	0.0117 (0.5774)	-0.0315 (-1.8004)*	0.0083 (1.4239)	0.19945 (5.3543)***
LEV	0.1325 (3.2875)***	-0.0524 (-2.5543)**	0.1392 (2.9522)***	0.1113 (1.5128)	0.0365 (1.8746)*	0.0242 (1.0780)
LD	-0.0022 (-4.7386)***	-0.0077 (-4.6020)***	-0.0061 (-5.5506)***	0.0286 (3.9249)***	0.02 (2.7265)***	-0.047 (-1.6561)*
OPCOST	0.0515 -0.9197	0.021 (2.4317)**	0.004 (4.6318)***	-0.2216 (-4.2485)***	0.1457 (2.1215)**	-0.00078 (-0.2172)
C	-0.0342 (-2.0604)**	-0.0205 (-0.9366)	0.0227 (0.9958)	-0.1179 (-3.1726)***	0.0068 (0.5255)	0.0417 (1.4342)
R.SQUARED	0.4399	0.1545	0.2105	0.3609	0.2481	0.4424
ADJ.	0.4196	0.1378	0.1901	0.3319	0.1765	0.3939

***significant at 0.01,** at 0.05 and *0.1significant levels.

Table V: Major Findings of Past Studies

Author	Sample Period	Countries	Significant Variables to NIM
Angbazo (1997)	1989 - 1993	286 on USA commercial banks	• Core capital/ TA (+ ve) • Earning assets/ TA (+ ve) • NCO/ Average loans (+ ve) • Liquid assets/ liabilities (- ve)
Demirguc Kunt and Huizinga (1999)	1988 - 1995	80 OECD countries	• Non interest earning assets/ TA (- ve) • Equity/ TA (+ ve) • Loan/ TA (+ ve)
Tripe (2002)	June 1996-December 2001	New Zealand	• Core capital/ TA (+ ve) • Earning assets/ TA (+ ve)
Ben Naceur (2003)	1980 - 2000	Tunisia	• Loans/ TA (+ ve) • Core capital/ TA (+ ve)
Doliente (2003)	1994 - 2001	Southeast Asia countries (Philippines, Indonesia, Thailand and Malaysia	• Total equity/ TA (+ ve in all countries except Thailand) • Liquid assets/ TA (+ ve in Thailand and Malaysia) • Loan reserves/ gross loans (+ ve in all countries except Malaysia) • Non earning assets/ earning assets (+ ve in all countries) • Personnel, administrative and other operating expenses/ TA (+ ve in all countries except Thailand)
Claeys and Vennet (2003)	1994 - 2001	36 Western and Eastern European countries	• Loans/ TA (+ ve) • Core capital/ TA (+ ve)

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